REMARKS

Claims 47-51 and 53-62 are pending in the application with claims 55-57 amended herein, new claims 60-62 added herein, and claim 52 previously cancelled in the preliminary amendment that accompanied the RCE filed October 17, 2002.

Claims 55-57 stand rejected under USC 112, first paragraph, as containing subject matter that was not described in the specification. Applicants request reconsideration.

Amended claim 55 sets forth an integrated circuit that includes, among other features, a layer containing Al over a semiconductive substrate, a layer of alloy material within the layer containing Al, and a conductive connection on the alloy layer. The alloy material layer contains intermetallic Al-Pd. Applicants assert that amended claim 55 is supported by the specification at least at page 6, line 8, page 7, lines 9-10, page 7, lines 19-21, page 8, lines 5-11, and elsewhere throughout the specification. Accordingly, Applicants request withdrawal of the lack of description rejection.

Claims 47-59 stand rejected under 35 USC 103(a) as being unpatentable over Tobben in view of Obeng. Applicants request reconsideration.

Claim 47 sets forth an integrated circuit that includes, among other features, a layer containing copper over a semiconductive substrate, a layer of intermetallic material within the layer containing copper, and a conductive connection on the intermetallic layer. The intermetallic layer contains copper and palladium and has a thickness of from about 50 to about 150 Angstroms. Pages 3 and 4-5 of the Office Action acknowledge that Tobben does not disclose the intermetallic layer containing copper and palladium or the intermetallic layer having a thickness of from about 50 to about 150 Angstroms. The Office

Action relies upon Obeng as allegedly disclosing the intermetallic material layer containing copper and palladium. The Office Action also alleges that Tobben suggests the intermetallic material layer having a thickness of from about 50 to about 150 Angstroms, even though Tobben only discloses a thickness of between about 300 to about 500 Angstroms.

Specifically the Office alleges it would be obvious to reduce the Tobben thickness from 300 to 150 Angstroms since the Office is of the opinion that such changes produce no functional difference. The Office further alleges that page 8, lines 19-23 of the present specification constitute an admission by Applicants of the functional equivalence of changing from 300 to 150 Angstroms. Applicants traverse.

The present specification at page 9, line 5 to page 10, line 5 and elsewhere discuss the advantage of reducing oxidation that is provided by intermetallic material. Page 11, lines 8-10, page 14, lines 9-12, and page 16, lines 3-6 discuss the concept of leaving "a sufficient thickness of intermetallic material" to reduce oxidation. It is well known to those of ordinary skill that a continuing interest exists in fabrication of integrated circuits to reduce the size of features where possible and to minimize processing time where possible. Applicants assert that the about 50 to about 150 Angstrom layer of claim 47 is clearly more advantageous in comparison to the between about 300 to about 500 Angstrom layer of Tobben. The size of the claimed layer is smaller, allowing an additional amount of miniaturization that cannot be obtained with the Tobben layer. Additionally, the claimed layer may be formed in less processing time because it is thinner in comparison to the

Tobben layer. Thus, the claimed thickness is clearly more advantageous than the Tobben thickness and not a functional equivalent.

Further, Applicants assert that the Office's allegation that the Applicants' specification admits the functional equivalence of the thickness difference constitutes a misunderstanding of the express text of the specification. First, page 8, line 21 of the specification expressly states that about 150 Angstroms is a preferred thickness within the broader range of about 50 to about 300 Angstroms. Accordingly, those of ordinary skill would not view 150 Angstroms as a functional equivalent of 300 Angstroms. Second, page 8, line 21 to page 9, line 1 recognize that a variety of thicknesses for intermetallic material are possible but that "depending on the application of the invention" a particular thickness may be desired. That is, certain thicknesses for intermetallic material are more desirable for certain applications of the invention than other thicknesses. Thus, Applicants' specification does not admit functional equivalence of layer thickness. Instead, Applicants' specification expressly states that those of ordinary skill should be aware that thickness is a significant parameter and should be selected to best suit the particular application of the invention. Such is clearly not an admission of the functional equivalence of any thickness for the claimed intermetallic material.

At least for the reasons described herein, Tobben in view of Obeng cannot be considered to disclose or suggest the intermetallic layer thickness of from about 50 to about 150 Angstroms set forth in claim 47. A finding of obviousness requires disclosure or suggestion of every claim element. Tobben and Obeng are both deficient in the same respect and combination of the references cannot be considered to disclose or suggest the

subject matter absent from both. Thus, claim 47 is patentable over Tobben in view of Obeng. Claims 48-51, 53, 54, and 60 depend from claim 47 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested.

The subject matter of amended claim 55 is described above. Applicants assert that neither Tobben nor Obeng disclose or suggest a layer of alloy material within a layer containing Al, the alloy material layer containing intermetallic Al-Pd. Accordingly, Tobben in view of Obeng fail to disclose or suggest every element of claim 55. Claims 56-58 and 61 depend from claim 55 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested.

Claim 59 sets forth an integrated circuit that includes, among other features, a layer consisting of copper over a semiconductive substrate, a layer of intermetallic material over the copper layer, and a conductive connection on the intermetallic layer. The intermetallic material layer consists of copper and palladium and has a thickness of from about 50 to about 150 Angstroms. As may be appreciated from the discussion above regarding claim 47, neither Tobben nor Obeng disclose or suggest the intermetallic layer with a thickness of from about 50 to about 150 Angstroms set forth in claim 59. At least for such reason, claim 59 is patentable over Tobben in view of Obeng. Claim 62 depends from claim 59 and is further patentable at least for such reason.

As asserted herein, claims 47-51 and 53-62 are patentable and Applicants request allowance of such claims in the next Office Action.

Claims 47-59 stand rejected under 35 USC 103(a) as being unpatentable over Chan. Applicants request reconsideration.

The subject matter of claim 47 is set forth above. Pages 3-4 of the Office Action allege that Chan, in particular Figs. 2K and 3D, discloses the claimed intermetallic material layer containing copper and palladium. However, review of Chan reveals that such reference does not provide any mention of intermetallic material or any composition that necessarily discloses intermetallic material.

The Office relies upon column 4, lines 57-62 of Chan, however, such text merely refers to "forming an alloy" of copper-palladium. As discussed on page 8, lines 5-9 of the present specification, mere disclosure of an alloy does not constitute disclosure or suggestion of intermetallic material. An alloy does not necessarily comprise intermetallic material. In addition, column 6, lines 5-9 of Chan relied upon by the Office merely describe electroless plating of palladium on copper. The Office Action does not provide any basis for presuming that electroless plating produces intermetallic material. Rather, Applicants assert that those of ordinary skill readily recognize that electroless plating does not necessarily produce intermetallic material.

Despite the absence of any teaching in Chan of intermetallic material, the Office fails to provide any explanation or justification as to how Chan can be considered to disclose intermetallic copper-palladium. Review of Chan does not reveal any methods that can be considered to necessarily produce intermetallic copper-palladium. Accordingly, the Office Action is defective in failing to adequately support the allegation that Chan discloses intermetallic copper-palladium. 37 CFR 1.104(c)(2) requires that the pertinence of each

reference, if not apparent, must be clearly explained. Further, when a reference shows or describes inventions other than that claimed by Applicants, the particular teachings relied upon must be designated as nearly as practicable. Rejection of claim 47 as unpatentable over Chan thus cannot be maintained for failure of the Office Action to comply with 37 CFR 1.104.

It appears that the Office might be relying upon Chan as inherently disclosing intermetallic copper-palladium. However, "the mere fact that a certain thing may result from a given set of circumstances is not sufficient to establish inherency." In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (citations omitted) (emphasis in original); MPEP § 2112. Further, "[i]n relying upon the theory of inherency, the Examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis added); MPEP § 2112. The Office Action has not and can not establish any teaching in Chan showing that intermetallic copper-palladium necessarily results from the teachings of such reference.

Claim 47 additionally sets forth that the intermetallic material layer has a thickness of from about 50 to about 150 Angstroms. The Office Action alleges that column 6, lines 5-9 of Chan disclose an intermetallic material thickness of from about 50 to about 300 Angstroms. However, as discussed above, metal barrier layer 91 of palladium is electroless plated and is not disclosed or suggested in any way to contain intermetallic

material. Thus, Chan fails to disclose or suggest the claimed thickness of intermetallic material.

At least for the reasons described herein, claim 47 is patentable over Chan. Claims 48-51, 53, 54, and 60 depend from claim 47 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested.

The subject matter of claim 55 is discussed above. Review of Chan reveals that such reference does not disclose or suggest a layer of alloy material comprising intermetallic Al-Pd, as set forth in claim 55. Chan further does not disclose or suggest the subject matter of claims 56-58 and 61 depending from claim 55. At least for such reasons, claims 55-58 and 61 are patentable over Chan.

As may be appreciated from the discussion above regarding claim 47 patentability over Chan, claim 59 is also patentable at least for Chan's failure to disclose or suggest intermetallic material consisting of copper and palladium and intermetallic material having a thickness of from about 50 to about 150 Angstroms. Claim 62 depends from claim 59 and is patentable at least for such reason.

In keeping with the assertions herein, Applicants assert that all pending claims 47-51 and 53-62 are in condition for allowance and request such allowance in the next Office Action.

Applicants note that a Supplemental IDS was filed on October 17, 2002 along with the RCE of the same date. Applicants did not receive a returned copy of the submitted Form PTO-1449 with the Examiner's initials indicating consideration of the cited

references. Applicants request consideration of the references and return of the initialed form with the next Office Action.

Respectfully submitted,

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